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ABSTRACT

The 4-H Club packet for preschool and elementary school children contains nine "keys", or short learning exercises, designed to enrich science and environmental education both in and out of the classroom. Each "key" includes the purpose of the activity, the intended audience, the best time of the year for the activity, background information, material lists, pre- and post-activity suggestions, and directions for the activity itself, which usually centers around a field trip. Subjects include exploring the environment through touch, smell, sound, and sight: environmental observation and photography: litter: solid waste disposal: and lichens. The final "key" is a lesson for teachers on writing teaching units for outdoor education. (SB)

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4-H School Enrichment Program

KEYS

To The Kansas Environment

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KEYS TO THE KANSAS ENVIRONMENT

Introduction

The Keys are short learning exercises designed for children of elementary school age that can be used to enrich science and environmental education in and outside of the classroom.

Each unit involves simple environmental concepts that require discussion, group activity; adult and child interaction in the environment.

The Keys represent your county Extension office 4-H-Youth enrichment program for schools.

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KEYS TO THE KANSAS ENVIRONMENT

Key I--Feelin' Textures of Nature

An activity to help us learn and appreciate the variety of textures and sensations available to us through the sense of touch.

Audience: Feelin' textures of nature was designed for kids 3 to 7. But read it over and try it on your next outing; it's fun for anyone.

Best time of year: Spring, Summer, and Fall

Objectives: Given that the audience recognizes differences in textures, and have completed this Key, each child will be able to find, collect, and categorize any ten of the textures listed on page 2 with 90% accuracy.

Where we are trying to get with this Key is to have small children learn to recognize and experience the textures and feelings of the objects in the world they share.

Background: Important ideas to stress--living and non-living things in the world around us have characteristics which we can touch and recognize by their "feel." Texture, like color, indicates health, age, and change. The millions of combinations of textures interplayed with color add richness to our experience with life. The "feel" of a live warm rooster is much different than that of a cold stiff dead rooster, and much different yet than that of a dried out mummy after the flies have eaten it. A ripe apple feels very different than a rotten one. A ripe persimmon "feels" good to eat compared with a green one. Fur and feathers feel fluffy but fur causes a different reaction when you find it in a hen's nest. Colors can be experienced on TV. Textures cannot. People should learn "feelings" by "feelin" things and having a chance to compare and associate them with the critters and plants that provide this variety.

Materials:

1. A large paper bag for each student
2. A 2' x 3' piece of wrapping paper for each person
3. Cellophane tape
4. Scissors or knife--one for each five people
5. A large selection of household and play materials of different textures.

Pre-Activity:

Some of your students may not recognize and associate the words describing textures to the materials that express them. To prepare for this activity, you might wish to try several preliminary activities.

1. Give each child a list of five textures to take home. Ask each to bring back an example of each texture. Take these examples, scramble them, and trade texture lists and samples around the room. Have students group and categorize samples according to the texture.

2. Have a blindfold feeling contest. Blindfold all the students and have them feel and identify an object by its texture. Run it like a spelling bee. The student with the most correct identifications wins.

You might wish to ask the children questions like the following:

1. Describe what an egg feels like. Is it rough or smooth? Is it hard or soft? Is it solid or spongy? Is it prickly or dull? How can you change it?

2. Name something natural that is rough?

3. Name a living thing that is soft? Spongy? Prickly?

List answers on the blackboard along with any other textures the students may be able to distinguish. Below are just a few of them:

soft	spongy	hard
smooth	rough	hot
cold	wet	dry
sharp	dull	even
uneven	gooey	slimy
leathery	downy	slick
bumpy	glassy	doughy
spiny	fluffy	feathery

Below is a simple poem that might be helpful in introducing the "feelings."

How Does It Feel?

Sticky is the paint Dad put on the door.
Sticky is the chewing gum dropped on the floor.

Soft are the marshmallows so round and white.
Soft is the pillow for my head at night.

Smooth is the ice on which you skate.
Smooth is the table top on which you ate.

Hard is the carrot on which you crunch.
Hard is the lollipop to lick after lunch.

Hot is the first sip of soup that you take.
Hot is the cake that's just been in to bake.

Sharp are the quills of a fat porcupine.
Sharp are the barbs on pasture fence line.

Rough are the edges of a sharp-toothed saw.
Rough is Daddy's beard all 'round his jaw.

Wet is a dog's tongue as he licks your face.
Wet is the milk you spill in haste.

Round is the ball which you throw so far.
Round are the tires on a fast new car.

Fluffy is cottonwood fuzz drifting in the air.
Fluffy is your teddy bear's deep rich hair.

Field Trip: You might ask students to tell you where they could find these textures and "feelings" outside. Suggest a field trip to collect these "feelings."

Pass out a large paper bag to each student. Ask them to bring back a sample of every "feeling" they can find. The materials collected will be brought back to class for classification.

You might wish to use the following activity as a variation of the field trip:

Pebbles, sticks, leaves, dogs, cats, feathers, and most everything else have characteristics which are expressed by that object. Color, shape, texture are characteristics which tell us what a thing is. Choose one characteristic to share by two pardners, like: collect objects that just have a sticky feel, a smooth feel, a prickly feel. Don't

tell anyone what "feel" you are collecting. Students should be cautioned about things that should not be brought back, like huge rocks, live mammals, birds, and reptiles.

Post-Activity: Bring these collections back to class, blindfold other classmates, and have them "feel" and guess what "feeling" you collected.

Students might then make posters out of their collections and label the items collected.

Do some things have more than one "feeling?"

Ask each person to show what they found in each "feeling" category. Have them arrange these treasures on a work table and compare the different textures present.

Who found the most different kinds of feelings?

Who found the most unusual kinds?

Do some of these things feel sticky and rough?

Do some of these things seem smooth and sharp at the same time?

Natural objects which are available in most parts of Kansas in the Fall are listed below. Note that many things have several "feelings."

Sharp----thorns on wild roses, plums, hawthorne, locust
----barb wire, broken glass
----cockle burs, thistles
Round----rose fruits, hack berries, cedar berries
----galls in goldenrod stems
----cross sections of most limbs and grasses
Sticky---sap of trees, juice of berries and mashed fruit
---mud
Rough---rock, tree bark, burs, some weed stems, walnuts
Soft----milkweed, cattail, cottonwood fluff, snow
----spider web, caterpillar, fur, feathers
Hard----nuts, rock, wood
Jagged--leaf edges, some rock, cedar trees
Smooth--milkweed leaves, cans, bottles, ice, apples
Wet-----snow, mud, water, some sap, dew
Slimy---frogs, salamanders, worms, some fruits
Spiny---rose, black, and raspberry stems; locust trees; cactus; wild plum trees

Good luck on this adventure. It's hard telling what you will come up with.

KEYS TO THE KANSAS ENVIRONMENT

Key II--Learnin' By Sniffin'

An activity to help us use the sense of smell to enrich our lives

Audience: Learnin' by sniffin' was designed for kids 3-7 years old. If you are older, read it over. There may be something in it for you.

Best time of year: Spring, Summer, Fall

Objectives: Given that the audience recognizes different odors or fragrances, and have completed this Key, each child will be able to recognize, find, and collect, and categorize by sniffing any 10 of the fragrances listed on page 6 with 90% accuracy. We are trying to help small children learn to recognize and experience fragrances. We hope it will add a rich dimension of awareness to their lives.

Background: Important ideas to stress--living and non-living beings have characteristic odors which we can smell. We recognize flowers by texture, color, and the fragrance they give off. Odor, like color and texture, indicates health, age, and change. Millions of fragrance combinations interplay with color and textures to make our lives rich in a constantly changing show. Each thing we experience puts out a different combination of sensations designed to entice us to eat it and scatter its seeds. It may be warning us to stay away, or telling us it is dead and rotting, working itself back into the soil to be used again in a new way. Our attitudes about things around us are governed by all of our senses but the sense of smell has a strong impact on how we react to things. Odors create different reactions in people because of past experience. A skunk may smell good to a youngster that traps skunks and makes money selling the pelts. A feed lot may smell bad to a city kid, but to the kid who knows his food, clothes, and Christmas presents come from that lot, it might be his favorite "smell." We feel there is something "good" in all smells and that the "good" should be presented. There are "bad" smells. But these are "good" because they warn us of pollution, death, danger, or waste, just as "good" smells of flowers and fried chicken alert us to pleasant happenings.

Materials:

a. 1 pint jar/2 students
b. A paper bag
c. An apple, orange, box of cinnamon, bottle of anise oil extract, blue cheese, limburger cheese, dove soap, motor oil, catfish bait, sardines, or substitute something you like or dislike.

Pre-Activity: Describing smells--odors are much more difficult than describing textures. We have words for fragrances; however, the variety is so great that it is difficult to standardize smells. We all know what the word "rough" describes. But describe the smell of rotting leaves on a wet fall morning, that transfers the same idea to everyone. We describe smells by comparison. A mushroom may smell musky like a skunk, or a wildflower may smell sweet like a wild rose. The breath of an owl smells like a rotten egg. Let's introduce this activity by laying some groundwork with questions.

1. What can you think of that stinks bad, you don't like it? Make a list.
2. What smells good? Make a list.
3. What smells so-so, not good, not bad, but smells? List some.
4. How are smells like tastes? List some.
   What are things that smell sour?
   sweet?
   putrid?
   rotting?
5. Describe why a thing smells bad? or good?

Suggest a game about recognizing smells.
Take the 10 articles listed in the materials section (or substitute other things) and camouflage them by wrapping in paper or pouring into a different bottle. Pass around the class, one by one, and have each youngster respond to the smell of it. Categorize the responses into: 1. Good smells, 2. Bad smells, 3. Neutral smells - 1. Sweet, 2. Sour, 3. Putrid. What is it? Can you identify it just by smelling it? How many kinds of smells are there? How would we find out?

Let's go find some new smells. Suggest a field trip to a garden and yard with lots of flowers, a park, a wild natural area, creek bottom or lake shore. Instruct the audience to pick up things and smell them. Some new strong smells they might wish to collect and share with their friends.

Field Trip: This trip can be taken within walking distance of most schools and within the school itself. A natural area away from the school might add additional interest and excitement. Instruct the kids to examine and explore the area and smell the things they find. Each pair of people should have a paper bag and a pint jar to collect "smelly" things. They should be encouraged to bring a large variety of "smells" back to class. Below is a list of "smells" available to most schools in Kansas, either in the school or nearby.

Hot lunch room and various foods and spices
Refuse burner
Nurse's or doctor's office
Crushed cedar or pine needles
Soil
Crushed weeds
Animals - dogs, cats, dead birds
Candy counter
Garbage cans or dump
Bus garage or filling station
Janitor's storeroom
Flowers
Tree leaves
Insects
Water--tap, creek, stagnant water in old tires or cans
Bakery
Petroleum products

Post-Activity:

You might wish to keep a collection of smells in the jars for a week to see if they change. Have the kids sort and categorize the smells into "good" smells, "bad" smells, "dirty" smells, "clean" smells, etc. Why does a thing smell? Put a smelly thing in a tightly closed jar. Does it still smell-- why or why not? You might wish to have the students bring new smells from home. Establish a smell collection.

The kids might enjoy personifying smells with puppets and masks and have each other guess what they are.

These are just some nutty, "smelly", corny ideas to make teaching and learning more fun. We hope you'll try them.

KEYS TO THE KANSAS ENVIRONMENT

Key III—Seein' Kansas Rainbows

An activity for helping us see and appreciate the color of the Kansas Environment

Audience: Seein' Kansas Rainbows was developed for kids three to seven years old.

Best time of year: Spring, Summer, Fall (a warm Indian Summer afternoon in September or October, or a warm sunny day in May)

Objectives: Given that the audience recognizes primary and secondary colors, and have completed the projects in this KEY, all of the kids will be able to find, collect, and categorize these colors in Kansas plants, animals, and non-living things with 95% accuracy. Where we are trying to get with this KEY is to have the small children notice, study, and appreciate the colors of the world they share.

Background: Important ideas to stress: Seasonal weather changes result in dramatic color changes. Rainbows of color add richness to our lives. Color changes chronicle the pulses of life. Change is constant and essential to life. Values of color, change, and life are developed through good experiences. We should help others have these rewarding experiences.

Within nature's color lies a reading of her health. Life, death, slumber, illness, robust health, birth, and all of the mysteries of this earth are printed in changing colors. Most of us are too busy to notice in more than a passing way. But you have all seen the quick rich red of a cardinal, the blue-green stench of a rotting cow, the dark rich browns of a dormant oak on a winter day, and the shiny red slick of a newborn Hereford calf. The spring is a fresh green. Summer is heavy greens and light browns. Fall is a rainbow of color splashed against the hills. Winter is stark contrasts of black, browns, or white. We teach our kids color with crayons, construction paper and TV adjustments. Maybe we should fill that out a bit by teaching with the creations they share the earth with in a living partnership.

Materials:

1. 18-24 assorted fruits and vegetables, real or artificial
2. 2 large boxes assorted color crayons
3. 3-8 shoe boxes or equivalent
4. a selection of colored construction paper
5. a stapler
6. a large paper bag for each person
7. scissors or knife, one for each five people
8. cellophane tape
9. 2' x 3' piece of wrapping paper for each person

Pg 8 a blank page

Pre-Activity: Several activities you might wish to try with young children to insure they are acquainted with colors follow:

1. Bring various fresh or artificial fruits and vegetables and have the children sort the fruits into color piles or baskets. Make a game out of it, teams who finish sorting the fastest, etc.
2. Empty several large boxes of crayons together and allow the children to sort and arrange them according to colors.
3. Take three shoe boxes and tape on a piece of red, blue, and yellow construction paper, one color to each box. Cut several pieces of paper from each of these colors. Assemble the children in a circle on the floor. Scatter the shoe boxes and pieces of paper in the center. Ask the children to pick up and place the paper in the correct box.
4. Give each child a piece of colored paper and a catalog or old color illustrated book. Ask them to find as many items in the catalog as they can which matches the color and cut out the items.

Discuss with the children color and what makes colors. Ask them if they can think of living things outdoors which have the colors they studied. Discuss color change which they have experienced and speculate as to why colors change. Challenge the kids. Do you think we could go out and find these colors in outdoor things? Where would we go?
Why are things different colors?
Is there a reason for all these colors? (Yes, they attract birds for scattering seeds.)
Do you know plants and animals that have different colors, or change colors?
Can we change colors of things? How? (Dyes, burning, pick and ripen friuts, etc.)
Why do colors change?
Can things be two different colors at once?
Plan an activity together, a field trip. Each child should bring a paper sack. Upon the sack each child should staple a common outdoor color and a scarce one. In each sack the child should collect outdoor things that match these colors.

Field trip: Take the kids to a place full of weeds, flowers, grasses, rocks, trees, birds, insects, mammals, and litter. Encourage the children to range out in pairs or alone within safe limits. Colors on the bags will be found in varying abundance. Encourage the children to collect small pieces of each different thing of the two colors they have. Plan the trip for 15-20 minutes. Give the kids a chance to compare, trade, fight, and generally do things kids do. Assist the laggers and encourage them to find the items. You find it, then, let them discover it over again. Litter is a good source of colors, use it.

Most of the shades and tones of color on litter are very difficult to match in nature. Litter may be the only source of some colors.
Return to the classroom, bags heaped with weeds, grass, leaves, seeds, pods, feathers, fur, flowers, bugs, litter, etc.

Post-Activities: It is sometimes best to skip a day or so between the trip and the follow-up, but the colors fade in storage. Store the bags, be sure the bags are identified. Provide each student with a 2' x 3' piece of wrapping paper. Dump out the collected material and allow the children to study the material. Have them sort out the colors. Group the materials by general color and attach to the paper. Make color posters. You may wish to try to identify the materials you collected. Now ask them to take their crayons and duplicate the colors they see in the natural things on the paper beside the object. Which colors are prettier? Which do they like the best? Discuss how important and beautiful natural colors are.
You may wish to repeat this KEY during another season and compare the colors you find.

The following are suggestions for natural objects found in Kansas which exhibit distinctive colors.

	Fall	Winter	Spring
Red:	Sumac leaves and berries rose hips Woodbine Ivy leaves Poison ivy leaves	Sumac berries Rose plant branches Cardinal feathers	Strawberries Roses
Green:	Grass, leaves, katydids Mallard duck head feathers	grass and plants under snow or south side of buildings, hedge apples	grass, leaves
Blue:	Water, bluejay and blue bird feathers Aromatic aster flowers Downy gentian flowers	sky	sky, lakes spring flowers
Yellow:	Sun flowers Upright prairie cane flower	Meadow larks breast feathers	
Orange:	bittersweet berries persimmon fruits leaves, grasses wild plums	bittersweet berries	lady bugs robin feathers
White:	Milk weed fluff dandelion fluff	snow rocks rabbits tails	wild flowers mayapple blossoms plum, apple, pear blossoms

Brown:	cat-tail heads	coyote fur	snail's shells
	persimmon seeds	rabbit fur	wet limestone
	pintail duck head feathers	squirrel fur	
	quail and pheasant feathers		
Purple:	wild grapes	Starling feathers	spring flowers
	purple prairie coneflower	pigeon feathers	
	fire weed	red cedar berries	
	blackbird feathers		
	poke berries		
Black:	dirt	wet bark	mud
	blackbird, Magpie and crow feathers		Angus cattle
	tree bark		

For further projects and information, see Color, Texture, Design in Space, a basic manual for the 4-H Home Improvement Program available through your county Extension office. Another useful resource on colors is Adventures in Color, Hailstones and Halibut Bones by Mary O'Neill, Doubleday and Co., Inc. Garden City, New York, 1961.

Key IV--Lichens, That Gray and Green Crud on Rocks and Bark

This study is centered on ecological principles of plants adapting to a hostile environment and thriving. Lichens are found everywhere, are small and easy to study and express, often profoundly, important and basic principles of ecology.

Audience: Ages 10 to 12

Best time of year: Anytime

Objectives: After the unit "Lichens" has been completed students will be able on written or oral examination to list the primary benefit of lichens to man, be able to categorize lichens into like color and texture groups, be able to estimate numbers of lichens in a given area and list four basic principles of ecology expressed in the growth patterns of lichens studied.

Background: Lichens are included in science studies of plants in most elementary and middle school curricula. They are used as prime examples of an association called symbiotic relationship. This means that two organisms grow in an essential and close association, both benefit the other and need each other. They are discussed and treated as single organisms in the naming processes. Soil building from rocks and tough organic materials is the primary function of these organisms. They are important in other respects also. In the cold taiga and artic zone of the northern hemisphere, lichens are important food materials for caribou, musk oxen, and even man. Forest fires are fought in Alaska to save the slow growing lichens as much as to save the trees. In parts of Alaska the lichens are more important as caribou food than any other food source. In Kansas, lichens are very common and many colors and species are present. Only a few people are aware of lichens, what they do and why they are important. Lichens are among the toughest and most resistant of living groups. You can find them where nothing else will grow - on rocks, old dry wood posts, and tree bark. These little cheezy looking, algae-fungi conglomerations stick tightly and etch out a living. They are unprotected from temperature changes and live in some of the driest micro-climates available.

Lichens have an interesting ecology which can be studied very easily with a minimum of equipment.

Materials:

- Hunting knife or screw driver
- Dissecting scope or 10X magnifiers
- Paper bags for collecting different lichens
- Centimeter ruler
- Paper, pencils, clipboards, etc.. for mapping purposes

Pre-Activity: Ask the following questions about lichens:

1. What are they?
2. What do they do for man?
3. How are they valuable?
4. If they break up rocks, how do they do it?
5. Where do they get water?
6. If they grow slowly, how do you know and how could you measure growth?
7. Why do they tend to grow slowly?

Ask the audience who have seen lichens and know what they are, to raise their hands. Suggest a field trip to find lichens and study them.

Field Trip: Take the group to the nearest tree stand, old rock pile, or rocky pasture. Nearly every rock and tree will have lichens sticking tightly to the surface. Have the group find all different types they can and collect the various colors and shapes to bring back to class for identification. Then have people pair into groups and map the distribution of lichens on a tree. Wrap a piece of poster paper around the tree being careful to orient the map to North-South and East-West sides of the tree. Map a belt about one foot high around the tree at chest height. Record the distribution of the colors and lichen types. Record the exposure of the sides of the tree as to being in the sunlight or shade, exposed to prevailing winds or protected, and what type of tree it was found on. Count the lichen plants on each map. Measure their size and average them. See the attached data sheets and simulated experiment.

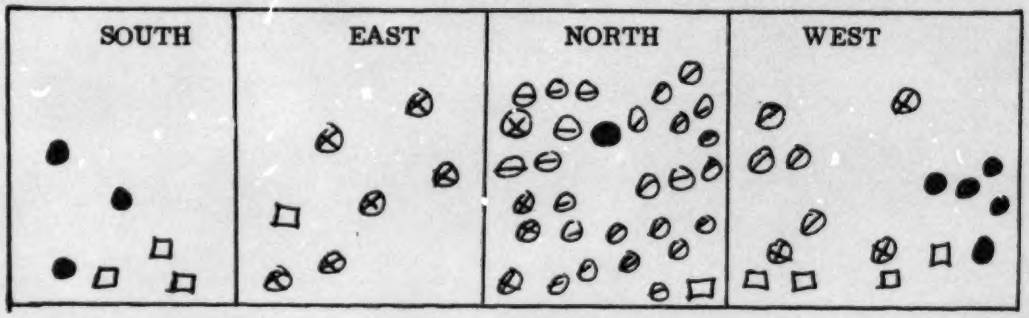
Post-Activity Compare the maps and data and question the results. Following are some questions you may want to ask:

1. Which side of the tree had the most lichens?
2. Which kind of tree had the most lichens?
3. Which kind of tree had the biggest lichens:
4. Which kind of tree had the most kinds of lichens?
5. What other plants were associated with the lichens?
6. Which lichens were most abundant on the sunny side?
7. Which lichens were most abundant on the dark side?
8. Which lichens were most abundant at the base of the tree?
9. Which lichens were most abundant on the dead branches?
10. How could you estimate the age of a lichen?
11. How big did each lichen species average?
12. How many lichens are there on the study tree? How could you find out?

Identify the lichens by grouping them as to color and surface configurations. Name the different types. Which kind probably needs the most moisture? Make a poster of the lichen types and write a short report on each of them from the information you collected on the field trip. Try growing them in the classroom using techniques developed by the students. Chip off bark or break dead branches and experiment with these plants by giving various amounts of water to them, varying amounts of sunlight, etc. Measure the growth with a centimeter ruler over a month period of time. Expect it to be minute. Why?

Sample map of lichen distribution. One foot high at chest height above the ground.

Elm tree shaded from the other trees.



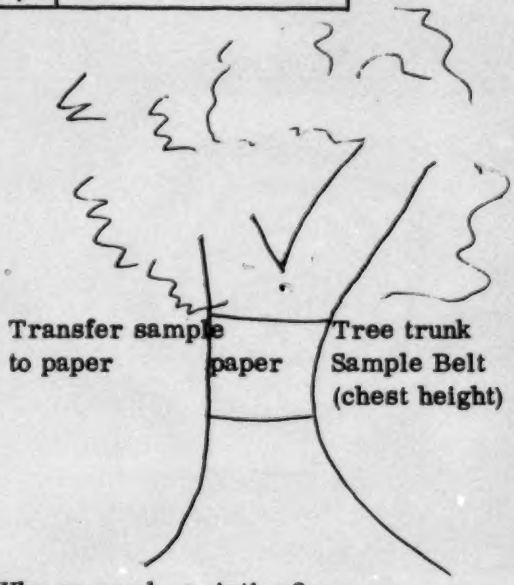
Type 1 ⊗

Type 2 ⊖

Type 3 ●

Type 4 □

Average size - Type 1 - 4 cm^3
Type 2 - 7 cm^3
Type 3 - 3 cm^3
Type 4 - 1 cm^3

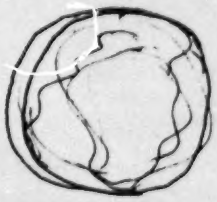


Type	1	2	3	4
South	0	1	3	3
East	5	1	0	2
North	5	35	0	2
West	3	4	5	9

Why so much variation?

Estimate of area-size of the lichen

Draw an estimated circumference, determine the radius and treat as the area of a circle



$A = \pi r^2$

$A = 12\ cm^2 \times 3.14$

$A = 452.2\ cm^2$ or $45.2\ cm^2$

or it may be rectangular or square shaped.

LICHEN DISTRIBUTION ON TREE SPECIES AND ROCKS

TYPE	1	2	3	4	5
ELM	8	10	7	8	0
MAPLE	3	15	1	0	0
WILLOW	0	0	27	0	0
BOX ELDER	25	2	8	3	0
GREEN ASH	23	2	8	2	0
ROCKS	1	0	0	0	10

This is an interesting experiment which can be done in almost any school yard. It is an excellent way to integrate math and science concepte. We hope you will try it.

Key V--Listen! Sound Is the Music of Life

An activity to help us use the sense of hearing to interpret the meaning of life and change.

Audience: Listen! Sound is the Music of Life, was written for children 3-8 years old. Since all of us listen, this project might be fun for older people as well.

Best time of year: Spring, Fall, Winter - anytime

Objectives: Given that the audience recognizes differences in sounds and has completed this study unit, each child will be able to recognize and identify 80% of the sounds recognized on the field trip. We want young children to learn to discriminate between sounds and integrate sound with their other senses to add pleasure to their lives. The multitudes of mechanical sounds that bombard us often deaden us to the more pleasurable sounds of living creatures and weather. This project calls attention to the sounds of life, singing of birds, choruses of frogs and insects, moaning and whispers of the wind, and chirps and chatters of mice and men.

Background: Important ideas to stress - Living and non-living beings produce characteristic and unique sounds which we can hear. Birds can be recognized by their shape and color only when we can see them. We can identify most birds by their songs alone. Sound is nature's way of communicating directly and seeking out relationships of one thing to another. A frog doesn't sing because he likes to sing. He sings to attract a mate, so that eggs are fertilized, laid, and new frogs are hatched for the next year. Birds sing to show other birds and animals which tree, grass area, nest or fence post belongs to them. A singing robin says, "Look, I am here, this belongs to me. Stay out!" To us we just appreciate the song and the melody it brings a spring evening. Air moves and communicates by its moving that air has power. A whispering breeze means low power, a howling gale means enormous power. It tells us to take to a safe place, or it offers us an air conditioned cooling. Sounds make us happy, sad, mad, sleepy, hungry, or scared. Weird sounds give us goose bumps, make our feet tickle. Loud sharp sounds hurt. Sound is an amazing thing; a gift from nature to help us get along with nature. Sound is for you to make and share. Sit and listen to the sounds of the day: sparrows chirping, dogs barking, crows cawing, sheep bleating and locusts buzzing. It's all a melody to make you happy and to share with you the peace this life offers.

Materials:

a. A record player - 4 records
   1. Acid rock record - Iron Butterfly, etc.
   2. Soft melody music
   3. Nursery rhyme or children's songs
   4. Bird, insect or animal sounds

b. A cassette tape recorder with two, one hour tapes.

Pre-Activity: The following ideas might help you to motivate your charges.

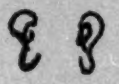
1. Pre-tape sets of sounds of common and unusual sounds. Play them to the youngsters and have them identify each sound.
2. Ask the youngsters to close their eyes and listen carefully. Make a sound, then ask the youngster to do just as you did. Here are some ideas.
   a. Three slow claps
   b. Complete silence
   c. Two fast claps
   d. Complete silence
   e. Snap, snap, clap
   f. Stamp, snap, slap the desk
   g. Stamp, stamp, pause, whistle, snap, etc.
3. During quiet periods, encourage youngsters to listen to different sounds in the classroom. For example: Tick of a clock, chair squaks, cough, sneeze, laugh. Categorize sounds as loud, soft, sharp.
4. Give each child a toy animal, a picture can be substituted. Ask them to listen, make an animal sound. Ask the youngster holding the animal that makes the sound, to hold it up and repeat the sound. Work completely around the class.
5. Ask the children to make all the kinds of sounds people make. List them.
6. Sing "Old McDonald's Farm."

Field Trip: A field trip can be taken around school, to a farm, downtown, to a quiet wooded spot, or anywhere that is convenient. Take a cassette tape recorder with you. Record all sounds possible. Caution the youngsters to be as silent as possible, to talk in whispers and to listen. Each should take a notebook and pencil and write down a list of all the sounds they hear. In 20 minutes, the variety of sounds collected is amazing. It is often good to try to provide stark contrasts in areas and the sounds provided, like main street noises compared with a park, zoo, or woodland. Have an Indian hike in the woods. Have the class go single file very carefully, trying not to make a sound. Avoid stepping on dry leaves and twigs. No talking above a whisper. Stop frequently to listen and look to identify the source of the sound. List the sounds that are heard. When a good variety of sounds have been collected, return to the classroom. Plan a night trip where you hear a sound, then go find what is making it.

Follow Up Activities:

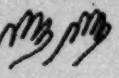
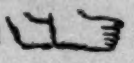
1. Play back the tapes you made. Identify together the sounds you can recognize.
2. List the sounds "collected" on the blackboard.
   Answer the following questions:
   Which sounds were most common?
   Which are most scarce? Loudest? Softest?
   Which are the hardest to distinguish?
   Which are man made sounds?
   Which are natural? Were there "dangerous" sounds?
   Which did you like the best?

3. Give each youngster a ball of clay and ask them to mold some of the sounds they heard. Mold the clay into the object that would look like what they think the sound should look like. Imaginative students will catch on quickly, some may need more help. The creativity expressed with this activity is often very interesting.
4. You might wrap this activity up with this poem:

We listen with our  of course,

But surely it is true,

That our and

And  and 

Help us listen too.

We hope you will take some time and try this activity. Learning to read signs of life by sounds adds richness and pleasure to your life.

Key VI--Studying Kansas Refuse Gardens

This activity centers on a critical, mathematical study of how we handle our solid wastes. It is both interesting and a very educational experience.

Audience: This unit is directed towards upper elementary grades. It can also be successfully completed by college and other adult groups.

Best time of year: Anytime, however, snow and cold covers some of the trash and lessens the visual and olfactory impact of the dump.

Objectives: Upon completion of the unit "Studying Kansas Refuse Gardens," participants will take a written or oral examination with 85% accuracy. They will be able to list three alternatives for managing solid wastes, will be able to list and categorize major waste product categories, list and identify at least four natural recycling processes and formulate suitable alternatives to the method used for local solid waste management.

Background: The history of man is read in his garbage piles. History of man is being made presently in an unprecedented quantity. The real tragedy of the management of our wastes is not that they are there, but that we do not provide for their reuse. We are, in effect, taking mineral (iron, aluminum, sand for glass) from areas of high concentration where they can be obtained cheaply and spreading them out. When the concentrated resources run out we will have an expensive process of collecting these minerals for reuse from our scattered dumps and piles. Our dumps may be the mines of the future. It would seem that the greatest pollution problems could be solved by several steps which might cost the consumer more initially, but would benefit him in the long run by eliminating hidden costs. Why not manufacture cars, appliances, furniture, machinery and clothing with lives measured in 30 year periods rather than five years? Why not establish an ethic which sacrifices fashion and style for utility and service? This activity is centered around a mathematical determination of the amount of garbage generated, the composition of that garbage and what is happening to it.

Materials:

1. Pencil
2. Data sheet, notebook
3. One yardstick or 12' metal tape for every four students

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Pre-Activity: Discuss garbage and solid wastes. Ask questions relative to where all the metals, plastics, glass and wastes come from in the beginning and where they end up, what happens to it; where it is in your county. How do we handle wastes? How much does it cost? How much does it cost to manage garbage dumps, old car bodies, litter pick up and disposal, etc,?

Questions: What is our most common waste item? What is our biggest litter problem? What happens to litter, paper, plastics, tin cans, aluminum cans, glass, rubber, wastes? How do we dispose of them here? Propose that the class study these questions and prepare a report on it.

Field Trip: Plan and take a field trip to a local city dump and/or farm dump. Study its location in relation to the environment around it. The following questions may be helpful:

1. Is the dump an eyesore? Does it affect the value of the land around it?
2. Does it contribute pollution to a lake, river, or stream, in the area?
3. Does the smoke and smell of the garbage blow over the city or anyone's house?
4. Is the refuse treated or burned to insure that there are no disease breeding rats and mice infesting the dump?
5. Is the dump far enough from houses and town to insure that the rats and mice won't infest them from the dump?
6. Is the dump fairly well organized where types of garbage and waste materials are separated for efficient treatment or possible recycling?

Pass out data sheets (examples are attached) and have the youngsters fill them out by assigning each person or pair of persons a representative sector of garbage. Calculate the volume of the sector, later add the volume of all sectors to get an idea of the volume of waste in the dump. Encourage youngsters to count the different types of refuse and record them. They can return then to the classroom for a follow-up. NOTE: The suggested size for the study sector should be at least 20' by 20' surface area. Step off length and width of the plot to give youngsters practice at calculating volumes, and areas of pyramids, rectangles, etc. It also provides a chance to use trigonometry and geometry concepts and give students some practical usage of them.

Follow Up: Calculate from the data sheets the volume of garbage, the most common type, least common and specifically itemize the waste content. Discuss the questions asked in the pre-activity. Try to formulate alternate methods of treating the wastes itemized and calculate the costs of managing those wastes. Write a report on the dump.

History - When was it started? What was the land used for before the dump was placed there? How much did the land cost? Who manages it? How much is he paid? Where does the water which runs off the dump, end up? Could it be moved to a better location to minimize damage? Could it be beautified? What is being done to improve the situation, or are people satisfied with it? Formulate reasonable alternatives.

Tips - Instruct kids to wear proper footwear; old boots or high top shoes.

DATA SHEET NUMBER ONE

SECTOR NUMBER _____

DATE _____

AREA: Calculate volume of trash. Estimate by sampling methods numbers of:

BOTTLES

_____beer
_____catsup
_____pop
_____juice
_____liquor
_____misc.
_____TOTAL

CANS

_____beer
_____oil
_____food
_____paint
_____misc.
_____TOTAL

METALS

_____car bodies & pieces
_____junked appliances
_____bed frames
_____misc.
_____TOTAL

PAPER

_____books & magazines
_____sacks
_____cartons & boxes
_____misc.
_____TOTAL

PLASTIC

_____buckets
_____sacks
_____sheets
_____food containers
_____soap containers
_____misc.
_____TOTAL

WOOD

_____boards
_____furniture
_____misc.
_____TOTAL

MISC.

_____old tires
_____mattresses
_____clothes
_____TOTAL

TOTAL PIECES OF GARBAGE AND JUNK COLLECTED OR TALLIED _____

DATA SHEET NUMBER TWO

SECTOR _____

ROTTING ITEMS (LIST)

1. Melons _____
2. Banana _____
3. Meat leftovers _____
4. Corn _____
5. Cereals _____
6. Paper _____
7. Cloth _____
8. Wood _____

TOTAL _____

CORROSING ITEMS (LIST)

1. Tin cans _____
2. Car bodies _____
3. Iron scraps _____
4. Steel drums _____

TOTAL _____

NON-CORRODING ITEMS (LIST)

1. Rubber tires _____
2. Glass _____
3. Aluminum cans _____
4. Plastics (some) _____

TOTAL _____

% of recycleable materials present _____

RECYCLEABLE ITEMS (LIST)

1. Rubber _____
2. Plastics _____
3. Glass _____
4. Iron _____
5. Aluminum _____
6. Paper _____

TOTAL _____

SIGNS OF MANAGEMENT OF WASTE MATERIALS

1. Dirt cover
2. Burning
3. Breaking into smaller pieces
4. Decaying -- insects, rats and mice

DATA SHEET NUMBER THREE

SECTOR NUMBER _____

NAME _____

DATE _____

COST TO THE ENVIRONMENT (LIST)

NEGATIVE	POSITIVE
1. Stinks	1. Cheap
2. Ugly	2. Better ideas?
3. Runs off into slough	
4. Poisonous materials into water supply	
5. Serves as source of flies, rats, and mice.	

DEVELOP HISTORY OF THE DUMP:

1. When was it started?
2. Who owns it?
3. Who can dump there?
4. How long will it last?

DEVELOP SOME ALTERNATIVES:

1. Read about other methods of waste disposal
2. Recycling
3. Beautifying

Key VII--Stalking the Kansas Environment With a Camera

An activity to heighten observation and appreciation of the Kansas environment through the media of photography.

Audience:

This activity is intended for upper elementary grades.

Best Time of Year:

Anytime, some of these activities are extensive and cross over the seasons.

Objectives:

1. To encourage Kansans to observe and record environmental issues through the media of photography.
2. To encourage Kansans to compare those activities of man that exhibit environmental damage with those that do not.
3. To develop in people an appreciation for the beauties of a quality environment.
4. To help the people develop a concern for the future of the environment.
5. To record sequential events that lead to either the improvement or deterioration of the environment.
6. To increase the creative thinking and action of the Kansas youth

Background:

Youngsters should know how to operate a camera before launching this activity. Most school libraries have books on photography. The 4-H photography project has several booklets that teach the use of the camera. We suggest that this key be used to supplement the 4-H photography project. Some operations are basic to all cameras, however, specific types of cameras will need to be studied and the operation explained thoroughly before this activity is attempted. Background information on the properties of light should also be studied in order to better understand how a picture results.

There are many ways to use a camera. A camera can be used to help develop in youngsters a desire to be creative and to be more observant and appreciative of their environment. The following special techniques can be used effectively:

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a. Interesting effects can be produced by using cellophane paper or a nylon hose over the camera lens.
b. Double exposures might be suggested for some of the activities calling for pictorial contrast.
c. Half-frame pictures might also be used for pictures calling for contrast. Take the subject of one picture to the left of the frame, then second picture, where the subject is on the right half of the frame. Cut the finished picture in half and mount them together as though taken as one.
d. Superimposing can be suggested. A superimposed "effect" can be achieved by cutting a part or parts of one or more pictures and assembling the parts upon another photograph.

Youngsters should be cautioned that their first efforts may not be successful. Technical problems will need to be discovered and solved as part of this learning process. The youngsters should be encouraged to invent their own ideas and solutions.

Start by giving an assignment. After that, assist your audience only when they seek help. Let them make their own decisions. Youngsters can be encouraged to choose their own assignments from those suggested here or let them develop their own. All of the people may be given the same assignment. Or assignments might be given to different groups. Let each person select his own method of completing the assignment. If this is a school activity, encourage students to do as much of the work after school as possible.

They may share their results in a post-activity if they wish to, but don't insist on it. Whenever possible help the students to develop the ability and desire to express their own feelings through photography.

You may wish to try the following suggestions:

1. Divide the class into groups. Better yet, allow the students to group themselves. There should be a camera for each student.
2. Set up a time schedule for the groups to carry out the activities--the first group will be given a certain length of time to complete their assignment, then the second group will begin theirs, etc. These should be spread over the academic year.
3. Each group will be given a different type of photography assignment. The pre-activity will be given to each group just prior to the beginning of their particular assignment. If at that time any student in that group prefers not to do that activity, he should be allowed to select some alternative photography activity.
4. Although all members of a particular group will be involved in the same activity, each member will perform it individually. Each student should be allowed to make as many of his own decisions as possible, during the course of the activity.
5. A post-activity should be carried out for each group. At the completion of the assignment of the final group, a post-activity of all those involved should be held.

Materials:

Kodak Instamatic cartridge cameras - 1 for every 5 people (minimum)
Personal camera whenever possible
1 roll black and white film for each camera
1 roll color slide
1 roll color print

Pre-Activity:

I like it - I dislike it.

This may consist of discussion only. First ask the students to think of things in their environment that they like. Make a list of things on the board. Some of their first thoughts may be that they like flowers, birds and trees. Next have a list of things put on the board that they dislike. Perhaps such things as dump-grounds, litter on the streets and algae growing on lakes will come to mind. Suggest that such things are the usual ones that persons seem to like or dislike. Suggest to the students before they go on the field trip that they try to clear their minds of the more obvious and universal likes and dislikes. Much time should be taken to observe before they begin taking pictures. Hand-and-knee examinations will perhaps produce some different thoughts.

The students may be divided into groups of four. Select an area for each of the groups. The areas for each group may be similar. For instance, a city block for each group may be assigned. Or, the groups may be sent to areas which are much different. For instance, one group may go to a city park, one to a farm yard, one to an affluent residential area, and one to a poorer residential area. Depending on the age level, an adult should accompany each group.

Field Trip:

Allow at least half a day for the first field trip. The youngsters should go to their designated areas. The groups should spend at least an hour just walking the area. Notes should be taken of the things they see which they like. Encourage the people to map the location of the likes they find so that they can be found again.

Then the area should be re-walked and notes taken on dislikes. Remember to make notes to identify the spot in which the dislike was found.

When observations are complete the group should sit down and confer about their findings. Those most liked and disliked by the group should then be photographed.

Post-Activity:

After the film has been developed, each sub-group might show their pictures to the rest of the participants. Show likes first. As each picture is shown, youngsters should tell why they like the particular thing. Questions can be encouraged. Did they take pictures of things they <u>should</u> like, or that they <u>really</u> liked?

Proceed in the same way with pictures of dislikes. Ask if anything could be done to change the things they found which they disliked. Ask for reactions to dislikes. Make a list of changes that would make dislikes into likes. Ask what might happen in the future which could change likes to dislikes.

Ask others if they like or dislike what others have photographed. Encourage active discussion.

To finalize this activity, the pictures which produced the most reaction from the majority of the class should be mounted and posted. Each group should also produce a mounted arrangement of their pictures.

MYSTERIES

Pre-Activity:

It is suggested that teams as small as possible be set up for this activity. Each team should be given one of the following assignments:

1. Take pictures that contain a clue as to the time of day it was when the picture was taken. Members of the team should be instructed to take pictures representative of each of the daylight hours. Depending on the time of year, suggestions such as the following can be given:

   a. Photograph a milk truck with lights on which would be representative of the 6:00 a.m. hour.
   b. A picture of a building showing very little (if any) shadow could represent 12:00 noon.
   c. A picture of a house with lights on could be representative of the 6:00 p.m. hour.

   Encourage use of shadows.

2. Take a series of pictures that tell a natural or scientific mystery story. Be certain that each picture contains enough clues so that when put together the series can be a whole story. Examples: a series of pictures that tell how an animal died, or how a lake became polluted, or what happens to a ripe fruit.

3. Take a series of pictures that will lead others to a specific treasure which you have found in nature. Take photos along the route you want someone else to be able to follow. Each picture must contain clues as to where it was taken along the route. Photograph the natural treasure you have found also. Suggest such a natural treasure as a patch of wild flowers, a tree growing out of a rock, or a set of tracks made by an animal in the snow.

Field Trip:

Time can be set aside for a field trip, but it is more conceivable to have this performed as an extra-curricular activity. Allow a period of several days for the team to do their studying and photographing. Since the element of suspense is present in this activity, be sure each team remains as secretive as possible.

Post-Activity:

Allow ample time for the post activity. It would be best to set aside a half day and arrange a field trip. After the pictures are developed each team should present their photos in the following manner:

1. Those with assignment No. 1 should show their pictures to members of another team. That team must then arrange the pictures in chronological order. They will probably need to go to observe some of the places where pictures were taken to get direction, especially if shadow was used. Those who took pictures will need to tell location of where picture was taken.

2. Those with assignment No. 2 should give their pictures to members of another team. That team must then see if they can figure out what the mystery is and what caused it. If the team can figure out what caused the mystery they should write about it, or be ready to retell it to the rest of the class.

3. Those with assignment No. 3 should give their pictures to members of another team. The pictures of the route taken to the natural treasure should then be followed. It will be necessary that they are told which picture is the first in the sequence, but then they should be able to follow the path and decide what the natural treasure is.

After the field trip the class members should return to the classroom to see how well they have solved the various mysteries they have been assigned. Encourage discussion.

This activity will make students aware of things that often go unnoticed. It can be a very rewarding study and will require dogged-stick-to-it-iveness!

MAKE-A-SOMETHING

Pre-Activity:

Ask students if they are aware that there is unnecessary waste in the world. Encourage them to discuss things which are wasted in their own homes. Suggest that many of the throw away items from home could be used in many ways. Ask students to make a list of throw away items, (not food). Have

students think about what could have been done with some of these throw away items. If they have difficulty getting started, ask what they think might have been done with a plastic bag that was thrown away. Suggest such things as using the bag for stuffing a toy or a decorative pillow. Proceed by suggesting that boxes can be decorated and made into storage boxes for mittens or scarves. Plastic bleach bottles could be turned into clothes pin holders. Waste paper may be recycled and made into paper bricks for building.

The word recycled must be defined. The reasons for recycling must be discussed.

Ask youngsters to take pictures of throw away items. Then take the throw away items and make something useful out of them. The "Pack of Fun" magazine suggests many toys and useful articles that can be made from recycled materials.

After they have made something from throw away items they should take pictures of the new article. (Suggest half-frame pictures described in the background information.)

On Their Own:

No field trip is suggested for this activity since each student will be working on his own and the project is very long term. However, it might be an eye-opener to take a field trip to the local dump ground. The activity "Studying Kansas Refuse Gardens" might be completed concurrently with this activity.

Post-Activity:

After pictures are developed, show the picture and the recycled article. Explain the use of the article. Invent a name for the new article.

Discuss whether there are larger things that could be recycled. Have the students research used car body recycling and water recycling.

Hopefully this activity will make students aware of the tremendous waste in our world and will make them want to be more conservative and efficient.

ADJECTIVES

Pre-Activity:

The students should be asked to list adjectives. Put them on the board as they are listed. Be sure the list is long - perhaps fifty. Have students make a copy of the list.

Tell the students that there is not a single thing in nature that cannot be described in some way by the use of an adjective. Ask for words to describe a flower like lively, delicate and pretty. Then name a specific flower such as a tiger lily. Ask for adjectives to describe it. Responses will undoubtedly change.

Have students select at least ten adjectives from the list. More can be selected if there will be extensive time for the field trip, but each person should pick the same number of adjectives. Once their selection is made, they cannot change it.

Depending on the number of cameras available the class should be divided so that each group has a camera. It would be ideal if each person had one.

Field Trip:

Allow at least a half a day. Bus students to different areas large enough so that they can spread out and not be close to one another. Suggested areas are a wetlands area, a farm, a set of city blocks, or a park. Each one will then find one thing to photograph that will fit the suggested adjective. If a group is working together, the group must select the adjectives first and then find something that it will describe.

REMEMBER: Each group or each individual must photograph the same number of adjectives, and they cannot change adjectives once selected. This will make the students more observant. Otherwise they will find something and photograph it and be able to fit an adjective to it.

Post-Activity:

After the film is developed the pictures should be shown. Each person should tell why he feels as he does about the picture he took. Ask other class members if they think the picture best portrays the adjective that was chosen. Encourage discussion. Discuss moods. Ask how something might be changed so that the adjective describing it could be changed. Ask what environmental change might take place so the chosen adjective would no longer apply.

This activity will be an eye-opener for all and will cause students to find that they have a feeling for the things around them.

"FOOTPRINTS"

Pre-Activity:

Present these ideas to your class with as much discussion as possible. Terms that are used by archeologists should be defined and discussed.

When archeologists find evidence of "footprints" of some past culture, they try to piece together the information about how these people lived. Pieces of baked clay may tell that they made their own dishes. Simple tools aid us in knowing their technical advancement. Bones found in the garbage areas tell us something of their food habits. Discuss with the people other "footprints" of past cultures.

Field Trip:

Plan a trip to a local refuse garden. Give this assignment to the group:

> If archeologists of the future made a "dig" over our city dump, what would they think of our "footprints"? Take pictures of some of their possible "finds" and be prepared to tell how they may interpret the "footprints".

Post-Activity:

Post the resulting photographs of the field trip on a bulletin board and ask the students to be the archaeologist of the future. Write how they might interpret each particular "footprint".

Discuss with the students this supposition:

> If man could find a way to recycle all wastes and garbage so that there would be no further build-up of dumps, how might archeologists interpret this?

This assignment can be used in connection with the activity, STUDYING KANSAS REFUSE GARDENS from the Keys to the Kansas Environment Series.

"MUST WE HAVE THE BAD TO ENJOY THE GOOD?"

Pre-Activity:

Discuss litter and pollution: the causes, reasons for existence and if they are really "necessary evils" of the good things. Some ideas which could be discussed are:

1. Air and water pollution from factories are, perhaps, necessary in order to have manufactured products.
2. Littered beaches in order that a fisherman can enjoy fishing.
3. Foamy streams and algae in lakes in order that man can have clean clothes.

Continue the discussion with these questions:

1. When do people litter?
2. Does this littering help them have a better time?
3. What is causing our streams, lakes and rivers to become polluted? Include the ideas of: a) raw sewage; b) phosphates in detergents; c) poor treatment of sewage; d) poor farming practices causing erosion.
4. Does this have to happen when we wash clothes? Because we farm?
5. Could we present these ideas so other people can be aware of our findings? How might we do this? Could a camera help us?

Field Trip:

Let's take a week to look for and photograph the good and the bad side of our environment. Try to take the photos in pairs as discussed in the pre-activity.

Post-Activity:

For those photos that show good things, ask if there is any bad that results and what we can do to eliminate the bad things that associate themselves with the good. Arrange an attractive display of the series of photographs.

A variation of this assignment is one of "Opposites".

A. Find and photograph things that represent opposite ideas.
B. Make a list of opposite word pairs and then go outside and photograph objects in the environment that represent the word pairs.

An example of this assignment would be one photo of a boy in the woods alone enjoying the environment; the second photo would be that of city traffic only.

FOR EVERY ACTION, THERE IS AN OPPOSITE AND EQUAL REACTION

(Cause and Effect)

Pre-Activity:

Cause and effect should be discussed here. There are two types of cause and effect relationships you could use--those showing present or past, and those showing supposition.

The people should be asked to use their reading books to find cause and effect relationships of both types. These should be read orally and discussed.

Field Trip:

The time involved for this activity is difficult to determine. Like many others in this unit, it would be best to extend the assignment over a week or two. The students would need to complete it on their own time.

They should be encouraged to think through the particular assignment quite thoroughly and observe their environment carefully before taking their photos.

Assignment 1: Go outside and find two things - one of which is responsible for the other.

Assignment 2: Go outside and find a series of events relating to the environment so that the first is related to the second, the second to the third and so on. Do it in such a way that the last event appears to have no casual relationship to the first.

Assignment 3: Photograph the series of a food chain, that is, the dependency of one living thing on another either man or creature.

Post-Activity:

The photographs should be arranged in logical order and mounted attractively. Those students wishing to discuss their assignments should be given that opportunity.

power, Power, POWER

Pre-Activity:

To get the students to think about power, ask such motivating questions as:

a. What is power?
b. How do you get it?
c. How do you keep it?
d. How do you lose it?
e. How do you use it?
f. Who has it?
g. How can power be measured?
h. Compare different kinds of power.
i. Which power is the most powerful? Why?
j. Which power is the least powerful? Why?

Field Trip:

Instruct the students to find things that represent power to you, photograph these things. If a group has only one camera, each person should find at least one thing to photograph.

This activity works well as an extra-curricular assignment. Students could be asked to look for things that represent power to them. They could check out a camera with which to photograph them.

Post-Activity:

Exchange power pictures and discuss what kind of power you see in each other's pictures. Tell what the power does, how it affects your environment-good or bad way.

Now Try This:

Considering the fact
that energy is necessary
for power,
now go back
and do the pre-activity,
field trip,
and post-activity
in terms of energy.

This is a very challenging and creative selection of activities. We hope you will try at least one of these with your group. The results of this activity are often very satisfying.

KEYS TO THE KANSAS ENVIRONMENT

Key VIII--Let's Study Litter

Audience:

Let's Study Litter was designed for 4th-6th grades

Best Time of Year:

Fall, Spring. This is an excellent study for late March or early April.

Objectives:

1. To acquaint the students with the harmful and negative effects of litter.
2. To acquaint students with the concept that there are many different types of litter and each type has a different potential effect on man and his environment.
3. To make the student aware that refuse should be disposed of in the proper place and manner.
4. To make the student aware of the quantities of litter present in our area and the costs of cleaning litter up.
5. To bring the student to the realization that litter hurts and costs him or her.

Background:

Nearly everyone considers litter as bad. They also can see and quantify litter as being a serious local problem. They may also be aware of the costs of cleaning litter up from road right of ways. But how many people consider the hidden costs which litter creates? A ruined tire, a beer can going through farm machinery, cuts and injuries to man and animals, smothering of plant life, fire hazard, disease transmission, breeding places for pests (flies, mosquitoes, rats and mice), etc. Litter is an eyesore, but that is the least of its damaging characteristics.

Litter can be classified in many ways. Here is a classification which puts litter in categories of residual effect and damage.

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Short term organic wastes.

1. paper
2. waste food products
3. human and animal wastes
4. discarded plant materials

Long term organic wastes.

1. plastics, rubber, other synthetic materials made from organic origin, oil, grease, etc.

Long term inorganic wastes.

1. metals
2. glass
3. minerals, stone, concrete

In terms of cost and danger to man, the metal, glass and mineral wastes are the most serious. Garbage and short term organic wastes are serious eyesores, periodic fire hazards, breeding places for mosquitoes, flies and disease, but they rot. The rotting process takes this material back into the food chain and it is recycled. It is important that these materials rot. However, there are proper methods for disposing of this material. Tossing it out at random is not the way.

It takes years, even centuries to recycle the metal and glass wastes we throw away. As these materials pile up, they become more serious hazards and remain hazardous until they are removed or buried by plants growing over them.

This activity was designed to educate our children about litter and the consequences and impact litter has on the environment.

Pre-Activity:

Introduce the topic of trash and litter and ask the following questions:

1. What is trash?
2. What is litter?
3. What is garbage? Are they the same thing?
4. Are there different kinds of litter? Soft litter? Hard litter? Rotting litter? Smelly litter? Ask the kids to list things they throw away in columns of whether it rots or not.
5. How much litter does the family throw away in a week?
6. Where do you find litter? Where do you see the most litter?
7. Is litter harmful? Ask the children to list the ways they think litter is harmful.

Make a chart for each person to take home to complete and bring back for the post-activity. On the chart, have the students record the number of cans and bottles each family throws away a day. A chart form is suggested below:

Name_____

Number of bottles and cans discarded.

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	TOTAL
Bottles								
Cans								

Collect the charts and calculate how much litter the familes of the class throw away each week and each year.

60(Total number of bottles and cans thrown away by your class per day) x 52(weeks per year x 3120 (No. cans and bottles thrown away by your class per year)

3120(No. bottles and cans thrown away by your class per year) x 12 (No. classes in your school) x 37,440(No. cans and bottles thrown away by children in your school per year)

Just how much is that?

If you were to set the cans and bottles in a long line, how long would it be? Follow this method to find out.

1. Mark off a one-foot line in class (use masking tape or chalk).
2. Bring some cans and bottles from home to set along the line. Be sure they are clean. Try to get different sizes of cans and bottles.
3. How many cans fit along the line side by side? 3? 4?
4. Now divide the number of bottles and cans in 1 foot (4 cans per foot) into the total number thrown away by children in your school in a year.

$$4 \text{ cans/foot} \;\overline{)\,37{,}440 \text{ cans}} = 9{,}360 \text{ feet of cans}$$

36
14
12
24
24

5. How many miles is that?

$$5280 \;\overline{)\,9360} = 1.75 \text{ miles}$$

5280
4080

How many tires have been ruined by litter among the people's families?

Multiply this number times $25.00 per tire?

Calculate a cost figure for litter per class per year.

Some additional questions:

1. How much land does litter cover that is not available for plants to grow?
2. Do you think disposal of all this trash may be a problem?
3. Where does your trash go? (You may need to call the City Hall to answer this question).
4. Could reuseable containers help to solve this problem?
5. Is it worth it to have returnable bottles rather than handier disposable ones? (You and your classmates may disagree. Also ask your parents for their opinion)
6. What kind of litter is most abundant? How do you account for this?

Field Trip:

1 hour

Place - a preselected road ditch or litter strewn area.
Equipment - very large paper bags or burlap 50lb. feed sack size (plastic bags are very poor for this activity)

Organize students into pairs. Have each pair collect litter for twenty minutes. Have one record each type of litter and classify it as to what harm it is doing or may do. Use a notebook.

After twenty minutes, have the students collect and talk about litter they have found. Count the numbers of kinds and numbers of each kind of litter.

Collect the bags and travel to a garbage can or bus to the dump and dispose of the litter.

Be sure adequate safety measures have been taken to guard against danger from traffic.

TIPS: Don't use plastic bags for collecting litter. They contribute to the litter. Try cloth or large paper bags.

Bring some band-aids and disinfectant for minor cuts.

Ask the children to bring old gloves to wear when picking up trash.

Don't be alarmed at some of the items the children find, the selection is unbelievable ranging from chicken bones to birth control devices.

Some of the litter items may be recycled by the class.

Post-Activity:

½ - 1 hour

Collect and review notes and results.
What was the most common type of bottle found? Why do you suppose there are so many of those?
Why do you suppose there are so many cans found?
Who found the most bottles or cans?
What did you find in and around the litter? Spiders and bugs, worms mouse nests? Do plants grow under litter?

How much did it cost to clean that area up?

1 hour for 25 students = 25 hours of work
25 hours x 50¢ per hour = $12.50 to clean up that much garbage.

If a grown man did it, it would cost
$1.50 to $2.50 per hour - $62.50 to clean up the same garbage.

Example: How many bottles between Manhattan and Riley on Highways 24 and 77 if ¼ mile and 74 bottles and cans on one side of the road? There are 19 miles or 76, ¼ miles between Manhattan and Riley. 76 x 74 = 5624 bottles and cans on one side of the road.

The total number of bottles and cans = 5624 x 2 = 11,248 estimated number of bottles and cans

Example:

How much does litter hurt?
How many of the students have scars from bottles and cans? How many have cuts which were infected or needed stitches?

Multiply the number of stitches times $5.00 per stitch, $5.00 per doctor visit and total this up for the class.

Have the children asked their parents how many flat tires they have had during the year caused by nails, broken glass or metal? Total the number of flats times $1.50 per tire.

This Key is fun and results in some very interesting finding. We think you and your charges will enjoy it.

KEYS TO THE KANSAS ENVIRONMENT

Key IX--Rollin' Yer Own

Writing a Teaching Unit in Outdoor Education

The process of environmental education and outdoor studies is not a difficult one to master. In fact, it is easy and uncomplicated compared with some of the teaching procedures you may be used to. The difficult part of outdoor studies is worry about confronting threatening unknowns while directing 15 to 30 children. This unit is written to help you get started writing your own outdoor study units or help you in using ours. We are not able to cover everything adequately and hope you will choose to develop your own teaching units around your areas of outdoor interest.

Your own enthusiasm and determination to make outdoor studies succeed is the primary key. We can't send you that. But we encourage you and hope sincerely that you will give this educational process and technique a try. Writing outdoor units is tough; doing them is also tough, but it is enjoyable. If you have planned well what to do, where you will go, who you will need to help you, and have a winning attitude about the trip, you and your people will win.

Title: You will need a title. Make it short, simple, and catchy.

Credits: Write your name on this study unit. It's yours to trade, sell, and use. It may not be better than anyone else's, but if it works and you are using it, it has got to be just as good.

Audience: Design the activities so that they can be done successfully by the group with which you are working. Seems obvious, but often we shoot way above our audience. They go home wowed by all the things we know, but they missed most of what we were trying to teach.

Best time of year: Recommend a time of year when others using this activity can expect to have the greatest chance for success. This seems obvious, but we have found people studying bird migrations in January. Surely, that's not the time to do it! Try October or April. It is difficult to study insects in February; it's easy in September or May. Some activities can be done anytime, but it's not practical to study snow in June.

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Objectives: We like to use behavioral (performance) objectives if they are held in proper perspective. They are poor if they become lids or limits to growth. We have seen them abused. We have also seen excellent results using them. We use them in a more general way than the objective purist and prefer to allow for maximum flexibility. If objectives are written too stringently they tend to discourage, if too liberal they become poor motivating factors. Objectives change as the audience changes. If you choose to write them, write them to help you determine when you have arrived at where you are trying to get.

Example: Upon completion of reading the KEY Rollin' Yer Own, the reader will be able to recall and describe the ten steps in writing an outdoor teaching unit, with 90% accuracy on oral or written examination.

Example: Given the completion of the KEY, Bird Nests and Plants, the audience will correctly identify mourning doves, grackles, and robins by their songs, flight, shape, color, egg shape and color, and nests on written and oral examination at a 95% correct rate.

Introduction: This section may not be useful for you, but may be useful to someone else who would try your method. We also call this the background section. Its purpose is to clue people in on what you are doing; where, when, and why you are doing it. It serves as a review section should you wish to do the activity again the next year. In it we try to include a discussion of what to do, where to go, and how to find things when you get there. We often include notes of interest and tips for success. We also include a discussion of why we do the activity, and why we do it in this particular way.

Materials: These are the tools you need to complete the project. On some trips no tools are needed. The fewer tools you need, the better. Some of the tools are obvious, some you <u>will</u> find you need after you go out the first time. Research your project, chances are someone else has tried it, or something similar, and can give you a list of equipment. Trial and error are good teachers. Beg, make, or borrow equipment. Most communities have equipment to handle almost anything you need. If not, try the junior high or high school. If they won't loan it to you, call the superintendent or a school board member. Your charges helped pay for it, they should be able to use it.

Pre-Activity: An environmental education-outdoor study unit should contain a pre-activity in which you introduce the study, explain the project, and who does what. In it you should plan for weather, use of equipment, determine when and where the kids will go. Include the audience in the planning. It helps to bolster their egos and gives them some practice at making decisions. It is a time for you to humanize and individualize the work. Jobs should be identified and either assigned by you or the audience. People frequently assign

jobs initially according to personality and physical ability, but, ultimately, end up involved in each job before the activity is over.

The pre-activity is the time to motivate the audience. Be excited about what will be done. Ask them questions to pretest them and to stimulate their interest.

We like to write a pretest into the pre-activity so we can measure what the audience learns. This comes in handy if anyone gives you static about the effectiveness of outdoor studies. Showing progess in the learning of facts, attitudes and skills using the outdoor studies is a cinch.

This is the time to determine what the audience should bring and wear. It is also the time to set the limits on the behavior. Explain clearly what you expect and what you expect them to perform. Pass out and practice with equipment and provide data sheets if they are necessary. This part of the project need not be long or complicated.

Field Trip: Perhaps the most difficult part of the environmental education process is the field trip. It is also the most essential part of it. To take a successful field trip we have found that the following steps are essential:

a. Planning - Be sure transportation has been arranged.

- Be sure the site you have selected contains the things you wish to study. Check it out first.

- Make an equipment checklist, don't leave essential equipment behind.

- Be sure that resource people, mothers, bus drivers, and anyone else who is going along to assist you is aware of the project and activities; include them.

- Be sure the audience has jobs to do to make every minute useful; don't just have them stand and watch.

b. Field trip - It helps to have checked the area and dry run the project before you try it with others.

- It helps to have other adults along if they have been properly instructed.

- Kids may be a little unruly the first time or two, but don't let it discourage you. Don't mistake discipline problems for enthusiasm.

These are the types of things that can be written into the field trip section. We also like to include tips on where to go and how to find things when you get there. For example: in a unit with water biology we list places where trips can be taken which are safe and alive with water creatures. A study site for Manhattan schools is Wildcat Creek which runs through the southwest corner of Manhattan. Any place along the creek contains a vast supply of insects, water life, and minnows. Look under and on rocks, vegetation along the edge and bottom for snails, scuds, leeches, and insects. Protozoa, rotifers, etc., are abundant in and on the vegetation bottom samples. It is helpful to note in this section the successes and failures after the trip is taken and ways to improve it for next year or the next trip.

Post-Activity: (Follow-up)

This part of an activity is the frosting on the cake. This is where the information collected on the trip is recorded and analyzed. We don't mean with a computer; we mean with reports, posters, bulletin boards, games, art work, and tests. This is where the questions asked in the pre-activity are repeated and the answers discussed. This is where the rewards are distributed.

Each person should be praised for his contribution to the project. If he has loused up, his peers will usually let him know that he has failed them. This is the time for a test to close the chapter. This is where old bird nests are carefully taken apart, the construction and materials described and listed; the insects studied and dissected; the microscopes used to identify pollen and protozoa; the arrowheads and pottery chips identified and mounted. It is where reports are written which include the information collected.

The follow-up--post activities vary in length of time with the objectives you have determined to be important. It may consist of decorating a tumbleweed Christmas tree with milkweed pods and cocklebur dolls as an art project; or graphing the number of fairy shrimp in your aquarium against time. This part of any outdoor study is exceptionally important, it is necessary that people be brought to realize the importance of analyzing the results of what they have done, comparing techniques and results, and reflecting on ways to do it more effectively. This is when you determine if you have made it to where you wanted to get. This is the problem solving process, hands on sensory experience; humanized, individualized instruction all tied up in one program. You write it, you organize and do it. Be proud of it. If you use this approach, we are convinced you will improve your teaching program and enrich education for yourself and your audience. Don't get upset about not knowing all the answers or being wrong. I learn something new on each trip out.

It takes commitment and resolve to tackle an environmental outdoor education program. It takes sacrifice. Outdoor education is a mixture of a teaching process and philosophy as well as a portfolio of facts. We wish you success and offer you assistance in any way we might help.